



Testimony before the House Committee on Energy and Technology Regarding House Bill 5237

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I am the Director of the networking services at Merit. I have personally lived much of the history of networking evolution in this country for nearly 30 years. I was in engineering with the AT&T Bell System before and after divestiture, with Bell Communications Research, with Ameritech. I moved into the Internet space as the Executive Director of an NSFNET Regional network that served the Big-8 football conference universities, and I was as a regional president of a commercial Internet provider, Verio, which was sold a few years ago to NTT of Japan.

Merit Overview:

I speak today for Merit Network, Inc. and our research and education community. Merit is a tremendous resource for the State of Michigan -- a "jewel" as Mike Boulus said yesterday. Our goal today is to confirm to you the value of our work to the State, and to explain briefly what we do so that as you continue working on this legislation, you are cognizant of how various sections will impact our work.

Merit has been a collaborative leader in networking since the early days of computing. Founded in 1966 by Michigan State University, University of Michigan, and Wayne State University to facilitate shared networking between the institutions, The universities wanted to investigate the value of tying three computers together. This concept was incredibly innovative and leading edge of course in 1966. So Merit established networking in Michigan long before the term "Internet" was invented.

The high performance networking requirements of research and education have traditionally lead the needs of the commodity market. What universities need and use today, the general populace will need and use tomorrow. Merit has over the decades been pushing the envelope of technology, and working on the technology transfer of that knowledge. We work on the development and the application of networking technology in support of education. We have always emphasized technology transfer, working continuously to "productize" innovations, enabling smaller institutions to quickly benefit from leading-edge network research.

Merit pioneered many of the practices and protocols used in today's Internet. Backed by a State of Michigan grant, a Merit-led consortium (including IBM, MCI and the Michigan Strategic Fund) won a \$39 million grant from the National Science Foundation (NSF) to engineer and manage the nation's first Internet -- the NSFNET. From right



here in Michigan, we engineered and managed the national network that was a primary precursor to the modern Internet.

Merit and Economic Development:

Merit has played a significant role in economic development in Michigan. Merit provided Internet backbone services to many fledgling ISPs when commercial service was unavailable, allowing many communities to get online for the first time. As these markets grew, commercial carriers entered the market. Merit was thus instrumental in incubating this young industry and fostering commercial competition.

Merit is a Michigan 501(c)3 corporation. Merit spun off three private corporations when our innovations appeared to have commercial promise, i.e., Advanced Network and Services (ANS), NextHop Technologies, Inc., Interlink Networks, Inc. We have preserved our non-profit status and culture.

Merit's Constituency:

At its very simplest, Merit is a networking company. We connect together here in Michigan the State universities, about half of the K-12s and ISDs, 60% of the 4-year private colleges, about 70% of the community colleges, half of the library cooperatives, many public libraries, some private school academies and a number of other non-profits such as museums, and foundations. These entities are connected on our backbone in Michigan, and we then haul the traffic to Chicago and other interconnection points to the world-wide Internet.

The institutions we serve are educating the future workforce in this State and country. A little more than a year ago, we had an "Internet2 Legislative Day" just down the hall in the Mackinac Room. If you were there, you probably enjoyed it, and if not, you probably didn't know we were here. We had a number of massive demonstrations happening simultaneously, but we run a solid network and didn't disturb business as usual. You would have been able to, for example, use an instrumentation demo and control a device in Japan from just down the hall. But what stays with me most is one of the 6th graders who was there. He was talking via video conference over Merit and Internet2 to Dr. Bob Ballard, the acclaimed underwater researcher who discovered the Titanic, and who was that day just above the Titanic on another expedition. The sixth grader was asking a question, and his preface was, "Dr. Ballard, remember last year when we were at the Black Sea?" Now this young man had, of course, never left Lapeer Middle School, but through the network, he was at the Black Sea. And it was normal to him, it was the way things are supposed to work. I turned to one of our engineers and said, "This is why we do what we do."



Merit is More than a Network:

But Merit is much more than just a network, even more than just a leading edge network. Merit was formed as a cooperative. Our roots, and our activities today, surround collaboration and cooperation. Our Members and Affiliates are with Merit because of the community and collaboration and because they can *live in the future* of networking in the country. Because we serve the entire state, the most rural parts of the entire state, and because of our high performance network, we're not the cheapest network. When the competitive variable is price, the incumbent telco or the cable company beats us. But if the constituent wants community, and to live in the future of networking, they choose Merit.

An example of a recent tremendous collaborative success was in Alpena, Michigan where Senator Carl Levin, U.S. Representatives Bart Stupak and Thaddeus McCotter, and Michigan Representative Matt Gillard, among many others, just celebrated the grand opening of the new home for the nation's only federal marine sanctuary on inland waters. The National Oceanic and Atmospheric Administration (NOAA) moved into a new home with a Maritime Heritage Center in Alpena. Merit worked in record time to bring the community together to get the fiber connectivity and advanced networking capability installed so that, Bob Ballard, could MC the program and have attendees talk to divers in Monterey Bay, California over the Internet. More importantly, the community now has a resource for the populace to, 1) "travel" around the world via the Internet, 2) to showcase its beauty and resources, and 3) to advance economic development for the area. Merit worked with, and continues to work with, the City and County with their respective fiber, the cable company on the circuit that hauls the traffic to Mt. Pleasant, the Community College, local private industry, the hospital, library and of course NOAA. Together this community achieved more than any one of us could alone. This is an example of Merit's cooperative and collaborative "matchmaker" role in communities in the state, which is strong and ongoing.

Merit is a Unique Advantage to the State:

Many states have recognized the need for advanced networking for education. Merit has many other peer networks. But other states have typically allocated appropriations to fund a state educational network. At least 21 states currently have explicit appropriations for their state networks. A number of others have line-item appropriations within their education budgets to support educational networks. In addition, the Texas, Ohio, New York, California, Washington, Connecticut, Iowa and Tennessee legislatures have allocated capital funds specifically to build a fiber optic education network.

Michigan does not appropriate any funds for educational networking and Merit receives no direct state funding. Most other research and education networks receive some portion of their operating budgets from state subsidies.



Each institution in Michigan that uses Merit must fund their own connectivity and find a provider capable of meeting their unique requirements. Merit has worked with higher education and K12 institutions to create an educational network in Michigan. Merit Members and Affiliates select Merit because it provides the high-performance networking support and collaborative benefits key to the educational community. *These institutions have formed a community within Merit and rely on Merit to meet their networking needs.*

Merit supports the community's technology support needs. We conduct an Annual Users Meeting, regular seminars and provide listservs on current networking issues where the community can talk to one another. These not only provide technical training, but also offer important opportunities for professional networking and discussions of best practices.

R&D and National Networking:

Merit also makes MichNet available as a collaborative test bed for new networking applications. Customers work closely with Merit on R&D activities that would not be possible with a commodity Internet company. Merit has a marketplace niche unique from that of other commercial service providers.

Merit participates in a number of activities of national and international scope that serve to keep Merit and Michigan at the forefront of networking innovation. Merit is the designated Internet2 connector for Michigan institutions, operating the state's only Internet2 GigaPoP. Internet2 has a *national* networking footprint. It is led by more than 200 U.S. universities, working with industry and government, Internet2 develops and deploys advanced network applications and technologies for research and higher education, accelerating the creation of tomorrow's Internet. As Michigan's Internet2 Sponsored Educational Group Participant (SEGP), Merit provides Internet2 access to research and education institutions that do not qualify for full membership. We are co-located with Internet2 in a purpose-built, high tech building in Ann Arbor. Our staffs work closely in many areas.

Changes in Network Demand and the Changing Network:

Educational institutions' networking requirements have grown increasingly complex in recent years. Growing use of advanced networking for distance learning, remote research collaborations and interactive video applications requires a flexible, highly adaptable network. Bandwidth demands continue to grow exponentially. This is consistent with historical trends over decades, i.e., research and education institutions (as well as the military) have lead the need, development and deployment of advanced networking. The telco leased circuit cost model typically becomes prohibitively expensive at the higher capacity rates these applications need. One example: telco leased circuits between Detroit and Chicago cost approximately \$1.5M per year. Fiber on the same route acquired from two telcos for 20-year terms, costs \$3M one-time.



Merit leases circuits, but Merit also acquires or builds fiber infrastructure

Where available, Merit has purchased fiber from commercial entities in order to serve its constituency. However, in many areas, there is no commercially available fiber for sale. Either none has been constructed, or the commercial owners are not willing to sell the fiber or use of it to Merit. Educational institutions often have unique needs that are outside the standard offerings of commercial providers. As a small market segment, there is often not an economic incentive for commercial carriers to meet these needs cost effectively, particularly since often the institutions are not in population centers where a build for a carrier yields a high financial return.

When acquiring fiber, Merit approaches telcos, cable companies and anyone else who has the infrastructure. Thus Merit has indeed purchased "excess capacity" from some educational institutions to meet the needs of the entire constituency. Quite simply, the selection of educational fiber was not driven by cost or anti-competitive factors, but by the unavailability of commercial fiber. We use "excess" capacity from a number of educational institutions in order to aggregate demand and provide cost effective service to qualifying educational and service institutions.

In addition, these institutions are like-minded with similar missions as goals as Merit. None strive for a revenue multiple or stock price increase -- or to dominate a market -- but rather to improve education and education access in the state.

Merit will also build fiber. But our collaborative roots are an advantage to more than just our immediate constituency. Merit has also worked with an independent telco in the State, to extend the fiber of an educational institution through a new fiber build. Merit's capital contribution to the build and collaborative efforts, 1) helped the independent telco complete it's service area, 2) helped the educational institution from whom Merit buys fiber, and 3) helped Merit's other affiliates in the area. We plan to work again with this corporation and other higher education institutions in other areas of the State where our constituency needs bandwidth.

Eliminating or restricting the sale of educational institutions' fiber capacity will disrupt current operations at Merit, reduce operational funds at the educational institutions, and ultimately cause higher costs for education in Michigan. Inability to utilize this fiber would result in a reduction of both available capacity and service flexibility to Merit Affiliates. In addition, educational institutions have already invested in this fiber infrastructure. If Merit could not access the fiber, additional fiber would need to be constructed, at significantly higher cost. Since Merit is a nonprofit, member organization, this cost would be borne by our members. The educational community would, in effect, be paying twice for the same resource.

We are certain that you do not want to constrain the good that Merit and educational institutions provide for Michigan. But we ask that the legislation be clear in not restricting the cooperative and collaborative work that is so vital to our community.



CONCLUSION

Yesterday's testimony included some very provocative thoughts that I would like to reiterate. My recollection and paraphrase is as follows:

Macomb County eloquently said that, "Collaborative minds generate ideas for the prosperity of the region -- for the betterment of society." We want the collaborative minds at Merit to be free to contribute to the prosperity and betterment of our region.

Saginaw Futures said that traditionally companies wanted road, sewer, and water. Now they want broadband, advanced telecommunications services. These are fundamental to economic development. I would add that Merit, by being "first" in technology in many areas, helps smooth the way for the commodity implementation of advanced telecommunications services.

Oakland County said Grandfathering offerings is not "good enough" -- technology changes, people's needs change, the way governments serve their constituency changes. One of my personal heroes said:

I am certainly not an advocate for frequent changes in laws and constitutions. But laws and institutions must go hand in hand with the progress of the human mind. As that becomes more developed, more enlightened, as new discoveries are made, new truths discovered and manners and opinions change, with the change of circumstances, institutions must advance also to keep pace with the times. We might as well require a man to wear still the coat which fitted him when a boy as civilized society to remain ever under the regimen of their barbarous ancestors.

I think our Oakland County speaker has a consistent message to that of Thomas Jefferson. When Thomas Jefferson made this statement he was not envisioning broadband and fiber networking in the year 2005. But his vision is valuable today.

Vint Cerf, the "Father of the Internet" had a similar view about change in a recent talk I heard when he talked about changes in the communications industry. He mentioned the Berkeley Roundtable on Internet Economics and their assertion about new business models for telecommunications. They believe that the transformation is more than any other in 125 years. "The technology has let the genie out of the bottle," Vint said.

So Merit asks you to not let our new MTA try to stuff the genie back in the bottle and go back in time. Embrace the advances in technology. Unleash the power that innovative minds can bring to our State, to our youth, and to all of our society. Allow new competitive models that grow from cooperation and high ideals. Allow, as Macomb County said, "Collaborative minds to generate ideas for the prosperity of the region." Slow-to-change institutions may struggle to remain in the old coat, but society as a whole must advance. Let's be certain our legislation gives us the new coat for our future.